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EXAMINER

CLEVELAND, MICHAEL B

ART UNIT PAPER NUMBER

1762

DATE MAILED: 08/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/673,204

Applicant(s)

STURM ET AL.

Examiner

Michael Cleveland

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2005.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-21, 23-31, 36-40 and 42-44 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☒ Claim(s) 15-21 and 23-27 is/are allowed.
6) ☒ Claim(s) 1-3, 5-14, 28-31, 36-40, 42-44 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/25/2005 has been entered.

Claim Objections

2. Claim 6 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Applicant has amended claim 1 to recite dyeing the organic host material by applying a dopant. Dyeing requires changing the color, and therefore necessarily modifies the light emitting properties, as recited by dependent claim 6. Accordingly, claim 6 fails to further limit claim 1, which requires that the dopant dyes the organic host material.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 36, 42, and 44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The limitation that "the solvent causes the dopant to diffuse through to an underside of the organic [layer, host material, or coating]" is unclear because it appears to be inclusive of penetration to any depth, but Applicant's arguments in the last paragraph in p. 8 indicate that it is intended to require that the solvent causes penetration through the entire depth of the organic layer.

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5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 9-14, 36, and 42-44 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 9-14: The specification as originally filed does not support the full breadth of the limitation “wherein a luminescence spectra of the organic coating having the dopant is different from a luminescence spectra of the areas of the coating after the dopant is removed.” The specification provides support for removing a dye from an organic coating, but does not clearly recognize that the removal changes the luminescence spectrum, and further does not provide support for removal of dopants other than dyes to change a luminescence spectrum.

Claim 43: The specification as originally filed does not clearly recognize that the luminescence spectrum of the dopant-dyed host is substantially the same as that for a blend of the host material and the dopant and different from luminescence spectra of the host alone and dopant alone. Therefore, it is not clear that Applicant had full possession of the entirety of the newly claimed subject matter at the time of filing.

Claims 36, 42, and 44: The specification as originally filed does not support Applicant’s implication of the limitation “the solvent causes the dopant to diffuse through to an underside of the organic [layer, host material, or coating]” because the specification does not clearly indicate that the dopant diffuses all the way through the width of the layer, and further, does not indicate that the diffusion through the entire layer is caused by solvent.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-3, 5-7, 9, 28-31, 36, and 42-44 are rejected under 35 U.S.C. 102(e) as being anticipated by Shirasaki et al. (U.S. Patent 5,895,692, hereafter '692).

Claims 1-3, 5-7, 28-31, 36: '692 teaches a method of making an organic light-emitting device (col. 1, lines 1-15)

providing a substrate (11);

coating an organic material (16) on the substrate (col. 4, lines 41-60; Figs. 6A-6B); and

applying fluorescent dyes (i.e., dopants) (13a-c) dissolved in a solvent (col. 7, lines 21-23) in selected areas to modify the color (i.e., the light-emitting properties) of the film (col. 4, line 61-col. 5, line 8; Figs. 7A-8B);

and causing the dopant to migrate into the organic coating (col. 7, lines 15-36).

'692 does not explicitly teach that a solvent from the ink jet or screen printing inks causes the dopant to diffuse into the organic material. '692 teaches the same organic material (polyvinylcarbazole) described in Applicant's specification, and the same dyes (coumarins) disclosed by Applicant, applied in the same form (dissolved in a liquid) as Applicant. Therefore, it appears that the same phenomenon of diffusion must have occurred in the case of Shirasaki '692 as did in the case of Applicant or else such diffusion is caused by essential features which are not present in the claims. Furthermore, '692 teaches that diffusion may occur while the pigments are in the form R', G', and B' as pigments dissolved in the solvent (col. 7, lines 15-30; col. 9, lines 21-23). Therefore, Shirasaki teaches diffusion while the solvent is present.

Claims 2-3, 30-31: The dye may be applied by ink-jet printing (col. 7, lines 15-24).

Claim 5: The dyes may be applied by screen printing (col. 7, lines 15-24).

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Claims 6-7: The inks may be red, green, or blue dyes (col. 5, lines 1-8).

Claim 29: The dopant is applied in a pattern and the dopant forms the same pattern after migrating into the organic layer (Figs. 7A-8B; col. 7, lines 15-36).

Claim 36: The dyes may be applied by screen printing (col. 7, lines 15-24). Screen printing involves depositing a patterned mask on the surface to be printed (in this case, organic layer (16)), applying the printing ink (in this case, containing the dopant) over the mask and the printing surface. The dyes are then caused to migrate into the organic film in the printed pattern (i.e., in the areas exposed through the screen) (col. 7, lines 15-36; Figs. 7A-8B).

Claims 36, 42, and 44: Diffusion into the layer necessarily requires penetration beyond the surface (i.e., to an underside of the layer).

Claim 43: An infrared spectrum of the doped film would necessarily have been the same as itself (i.e., the host material blended with the dopant) and different from an infrared spectrum of the either component alone because it would not have detected the presence of the bonds of the missing component.

Claim 41: Electrodes (12) and (15) are provided above and below the organic host material to form an organic light emitting device (col. 4, lines 41-52).

Claim 9: '692 teaches a method of manufacturing an organic device comprising:
providing a substrate,
providing a first electrode disposed on the substrate;
applying an organic coating having a solvent (i.e., a dopant) over the first electrode; and
drying the coating (i.e., removing the solvent (i.e., the dopant) from areas of the coating to leave undoped areas; and
depositing a second electrode over the organic coating (col. 1, lines 41-67).

An infrared spectrum of the dried film would necessarily have been different from an infrared spectrum of the wet film because it would not have detected the presence of the bonds of the solvent.

9. Claims 9-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Antoniadis et al. (U.S. Patent 5,719,467, hereafter '467).

'467 teaches a method of manufacturing an organic device comprising:

providing a substrate,
providing a first electrode disposed on the substrate (col. 7, lines 34-37; col. 6, lines 39-41);
applying an organic coating (PANI:CSA) having a dopant (polyester) over the first electrode (col. 7, lines 34-37);
removing the dopant from areas of the coating to leave undoped areas (col. 7, lines 37-38); and
depositing a second electrode over the organic coating (Fig. 2; col. 7, lines 39-43).

An infrared spectrum of the dried film would necessarily have been different from an infrared spectrum of the wet film because it would not have detected the presence of the bonds of the polyester.

Claim 10: The removal occurs by applying xylene in a pattern (i.e., over the entire substrate).

10. Claims 5, 36, and 42-44 are rejected under 35 U.S.C. 102(a) as being anticipated by Kobayashi et al. (WO99/12396, hereafter '396). (U.S. Patent 6,575,800, is used as translation). (Note: Independent claim 1 finds full support in provisional application 60/081492, but dependent claims 5, 8, and 42-44 do not.)

'396 teaches a method of manufacturing an organic EL device, comprising:
providing a substrate (7);
providing a first electrode (6) on the substrate;
providing an organic layer (5) disposed over the first electrode;
applying a material containing a dopant over the organic layer and dyeing areas of the organic layer by causing the dopant to migrate into the organic layer in said areas through the use of a solvent (col. 10, lines 41-48) (The application may be by screen printing (col. 8, lines 60-64), which involves covering the organic layer with a patterned mask (i.e., barrier) and applying the printing ink over the organic layer and the barrier. The dye penetrates organic layer (5) to form concentration gradient layer (3). Concentration gradient layer (3) may be made to extend all the way to the anode (i.e., the entire width of layer (5)). See Fig. 3.); and
providing a second electrode (1) disposed over the organic layer.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki '692 as applied to claim 7, above, and further in view of Tamano et al. (U.S. Patent 6,150,042, hereafter '042).

'692 is described above. It teaches that the dopant may be coumarin (col. 5, lines 1-8), but does not also teach the use of Nile red.

'042 teaches a number of materials for use as dopants in EL devices. The list (col. 77, line 19-col. 78, line 3) significantly overlaps that of '692, and includes Nile red (col. 77, line 66). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used Nile red in addition to coumarin as the dopants of '692 with a reasonable expectation of success because '042 teaches that Nile red is a dopant suitable for EL devices.

13. Claims 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki '692 as applied to claim 1, above, and further in view of Yuh et al. (U.S. Patent 5,521,047, hereafter '047).

'692 is described above. '692 teaches that the inks are fluorescent inks such as perylene. '692 is silent as to the identity of the solvents. Yuh '047 teaches that solvents such as acetone and tetrachloroethylene (TCE) are useful solvents for solutions (i.e. inks) containing fluorescent pigments such as perylenes (col. 2, lines 27-45). The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness.

Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected a solvent such as acetone or TCE as the particular ink

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solvent of '692 with a reasonable expectation of success because '047 teaches that they are useful solvents for carrying such pigments.

Claims 38, 40: '692 teaches that the receiving material is polyvinylcarbazole (col. 4, lines 55-60).

14. Claims 5 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki '692 in view of Chang et al. (*Appl. Phys. Lett.*, **73**, pp. 2561-2563, hereafter "Chang").

'692 is discussed above but does not explicitly state that the solvent causes the pigment to diffuse into the polymer. Chang teaches that dyes may be diffused into layers for light-emitting pixels by dissolving them in solvents that dissolve the underlying layer (p. 2562, col. 2, lines 21-27; p. 2563, col. 1, lines 27-33) to enhance the adhesion of the dye to the underlying layer. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have caused the dye of '692 to have diffused into the underlying layer by using a solvent that dissolves the underlying layer in order to have enhanced the adhesion of the dye to the underlying layer.

15. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki '692 in view of Chang as applied to claims 5 and 36, above, and further in view of Tamano '042 for substantially the same reasons discussed regarding claim 8, above.

16. Claims 5 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki '692 in view of Hebner et al. (*Appl. Phys. Lett.*, **73**, pp. 1775-1777, hereafter "Hebner").

'692 is discussed above but does not explicitly state that the solvent causes the pigment to diffuse into the polymer. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. Hebner teaches that dyes may be diffused into layers for light-emitting pixels by dissolving them in solvents that dissolve the underlying layer (p. 1775). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have caused the dye of '692 to have diffused into the underlying layer by using a solvent that dissolves the underlying layer

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with a reasonable expectation of success because Hebner teaches that such is an operative method of diffusing the dye into the underlying layer.

17. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki '692 in view of Hebner as applied to claims 5 and 36, above, and further in view of Tamano '042 for substantially the same reasons discussed regarding claim 8, above.

18. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi '396. '396 does not explicitly teach that the dopant includes coumarin and nile red. However, '396 teaches the use of coumarin and nile red individually (col. 7, lines 1-14). It has long been held that "It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... [T]he idea of combining them flows logically from their having been individually taught in the prior art." In re *Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980).

Allowable Subject Matter

19. Claims 15-21 and 23-27 are allowed for the reasons already of record.

Response to Arguments

20. Applicant's arguments, see p. 9, filed 5/25/2005, with respect to the rejections under 35 USC 103 of claims 1-3, 5-6, 28-31, 37, 39 based on Antoniadis '467 have been fully considered and are persuasive in view of the amendments because there is no disclosure that the dopant of '467 dyes the organic layer. These rejections have been withdrawn.

21. Applicant's arguments filed 5/25/2005 have been fully considered but they are not persuasive.

Shirasaki:

Claims 1-3, 5-8, 28-31, 36-40, 42-44: Applicant argues that not every solvent will induce diffusion. The argument is unconvincing because it is unsupported by evidence. Applicant argues that the term dyeing as used in the specification requires significant interaction between

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the dye and the film. The argument is unconvincing because Applicant has not met the burden to be his own lexicographer. "Where an applicant chooses to be his or her own lexicographer and defines terms with special meanings, he or she must set out the special definition explicitly and with 'reasonable clarity, deliberateness, and precision' in the disclosure to give one of ordinary skill in the art notice of the change." Applicant has provided no such definition for dyeing, and therefore is not entitled to any special interpretation of the term dyeing beyond any change in color that must inherently result from even the smallest degree of diffusion of the dopant dye of Shirasaki into the underlying layer. The Examiner further notes that Shirasaki explicitly teaches that the solvent may be present during diffusion, and to that extent, causes it.

Applicant argues that incidental diffusion at the surface does not suggest using a solvent to dye through the entire width of the layer. The argument is unconvincing because the claims do not require dyeing through the entire width. The term "an underside" is inclusive of penetration to any depth.

Antoniadis:

Claims 9-10: Applicant argues that Antoniadis is silent as to the luminescence properties of the polymer layer. The argument is unconvincing because if the film were subjected to Fourier transform infrared spectroscopy and/or Raman spectroscopy, it would necessarily give different results for the doped layer than the undoped layer because of the absence of the bonds of the dopant material.


Conclusion

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (571) 272-1418. The examiner can normally be reached on Monday-Thursday, 7-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Michael Cleveland

Primary Examiner

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8/5/2005